WHAT IS CLAIMED:

1. Reactor for converting a medium, comprising: alternately successively arranged layers of a catalyst carrier and of an insulating material, the reactor being electrically heated, the layers of the catalyst carrier and of the insulating material are arranged perpendicular to the main flow direction of the medium, the medium flows essentially perpendicularly through the layers of the catalyst carrier and of the insulating material, and the catalyst is a component of an electric circuit.

2. Reactor according to Claim 1,

wherein a first electric contact is arranged at a first contact point of the catalyst carrier and a second electric contact is arranged at a second contact point of the catalyst carrier such that the electric current flow takes place essentially perpendicular to the flow direction of the medium through the catalyst carrier.

3. Reactor according to Claim 1,

wherein several layers of the catalyst carrier are arranged in the flow direction of the medium, one or several layers of the electric insulating material being arranged between two or several layers of the catalyst carrier at least in areas.

4. Reactor according to Claim 1,

wherein the catalyst carrier is constructed as strips, the catalyst carrier being covered at least in areas by one or several strips of electric insulating material.

5. Reactor according to Claim 3,

wherein the catalyst carrier is wound in the manner of a filter candle around a first pipe piece, and the first pipe piece and the catalyst carrier are enclosed at least in areas by a second pipe piece closed on one side, the first and the second pipe piece each forming a component of a medium line.

6. Reactor according to Claim 5,

wherein the first pipe piece is electrically connected with the first electric contact, and an electric passage for the electric contacting of the second electric contact of the catalyst carrier is provided in the second pipe piece.

7. Reactor according to Claim 5,

wherein areas with a different cross-section and/or a different electric resistance are arranged along the longitudinal dimension of the catalyst carrier.

8. Reactor according to Claim 2,

wherein the electric insulating material has catalyst material at least in areas.

9. Reactor according to Claim 1,

wherein the catalyst carrier is formed of a metallic woven fabric and/or of a metallic network and/or of a perforated plate and/or of a sponge-type metallic material.

10. A reactor for converting a medium, the reactor comprising:

alternately arranged layers of a catalyst carrier and an electric insulating material;

a main flow path of the medium, wherein the alternately arranged layers of the catalyst carrier and the electric insulating material are positioned essentially perpendicular to the main flow path of the medium, allowing the medium to flow essentially perpendicularly through the layers of the catalyst carrier and the electric insulating material; and

an electric circuit, the catalyst carrier being a part of the electric circuit, wherein the electric circuit is used to heat the reactor.

11. The reactor according to Claim 10,

wherein an electric current flow through the electric circuit is essentially perpendicular to the main flow path of the medium through the catalyst carrier.

12. The reactor according to Claim 10,

wherein each of the catalyst carrier and electric insulating material is configured as a strip, an area of the catalyst carrier being covered by a strip of the electric insulating material.

13. The reactor according to Claim 12,

wherein the catalyst carrier is wound in the manner of a filter candle around a first pipe piece, and the first pipe piece and the catalyst carrier are enclosed by a second pipe piece having a closed end, the first and second pipe pieces each forming a component of a medium line.

14. The reactor according to Claim 13,

wherein the catalyst carrier has sections with different electric resistance along the direction of the electric current flow in the catalyst carrier.

15. The reactor according to Claim 13,

wherein the sections has cross-section areas of different sizes to vary electric resistance.

16. The reactor according to Claim 11,

wherein an area of the electric insulating material has catalyst material.

17. The reactor according to Claim 10,

wherein the catalyst carrier is formed of a metallic woven fabric.

18. The reactor according to Claim 10,

wherein the catalyst carrier is formed of a metallic network.

19. The reactor according to Claim 10,

wherein the catalyst carrier is formed of a perforated plate.

20. The reactor according to Claim 10,

wherein the catalyst carrier is formed of a sponge-type metallic material.

21. A method of making a reactor for converting a medium, the method comprising:

defining a main flow path of the medium;

alternately arranging layers of a catalyst carrier and an electric insulating material and positioing the alternately arranged layers of the catalyst carrier and the electric insulating material essentially perpendicular to the main flow path of the medium, allowing the medium to flow essentially perpendicularly through the layers of the catalyst carrier and the electric insulating material; and

providing an electric circuit and making the catalyst carrier a part of the electric circuit, wherein the electric circuit is used to heat the reactor.

22. The method according to Claim 21, further comprising:

arranging an electric current flow through the electric circuit essentially perpendicular to the main flow path of the medium through the catalyst carrier.

23. The method according to Claim 21, further comprising:

dividing the catalyst carrier into sections with different electric resistance along the direction of the electric current flow in the catalyst carrier.

24. The method according to Claim 23,

wherein the sections has cross-section areas of different sizes to vary electric resistance.

25. The method according to Claim 24, further comprising:

placing a catalyst material on an area of the electric insulating material.

26. A reactor for converting a medium, the reactor comprising:

a catalyst carrier means;

means for insulating the catalyst carrier means;

a main flow path of the medium, wherein the means for insulating the catalyst carrier means and the catalyst carrier means are positioned essentially perpendicular to the main flow path of the medium, allowing the medium to flow essentially perpendicularly through the means for insulating the catalyst carrier means and the catalyst carrier means; and

an electric heating means, the catalyst carrier means being a part of the electric heating means, wherein the electric heating means is used to heat the reactor.